



"A Success Story"

Montgomery County Public Schools

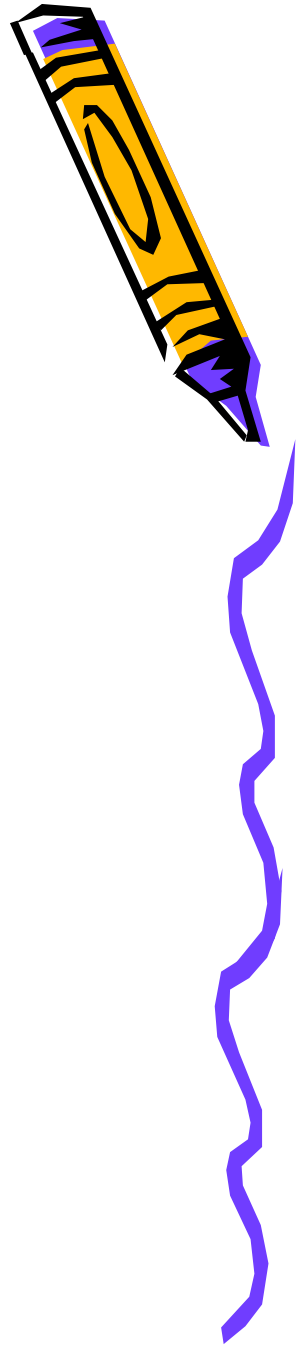
Speaker: Barry J. Hemler

3rd Annual IAQ TFS National
Symposium

August 8, 2002



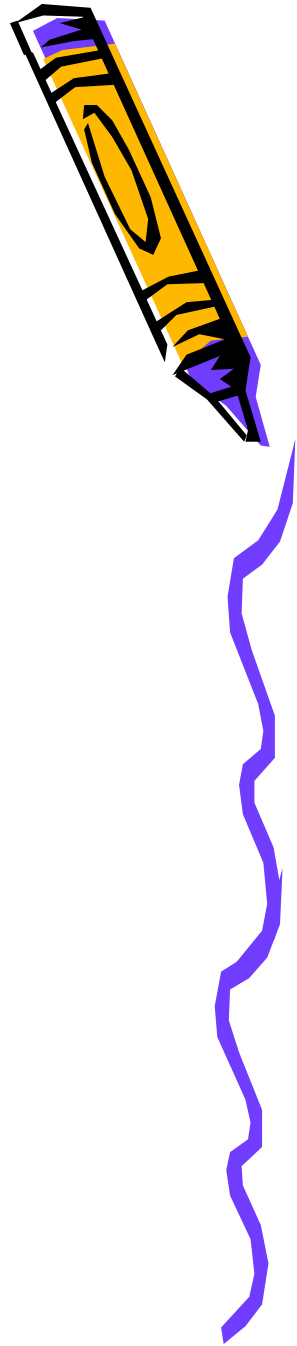
I AQ Comes to the Forefront!



- Odors of poured gym floor causes community concern of "toxic exposure"
 - Isocyanates as catalyst
 - Poor ventilation
 - Improper procedures



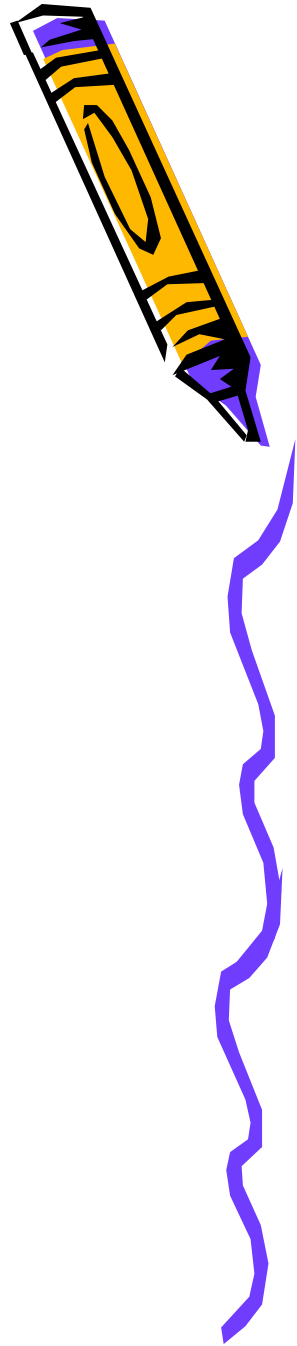
I AQ Comes to the Forefront!



- Visible mold growth and poor ventilation prompt assessment of entire school
 - Mold on furniture
 - Rusty ventilation equipment
 - Limited outside air
 - Moisture control/intrusion



School system responses questioned!



- Timeliness of response
- Qualifications of responders
- Dismissing community concerns
- Evaluation criteria of indoor environment

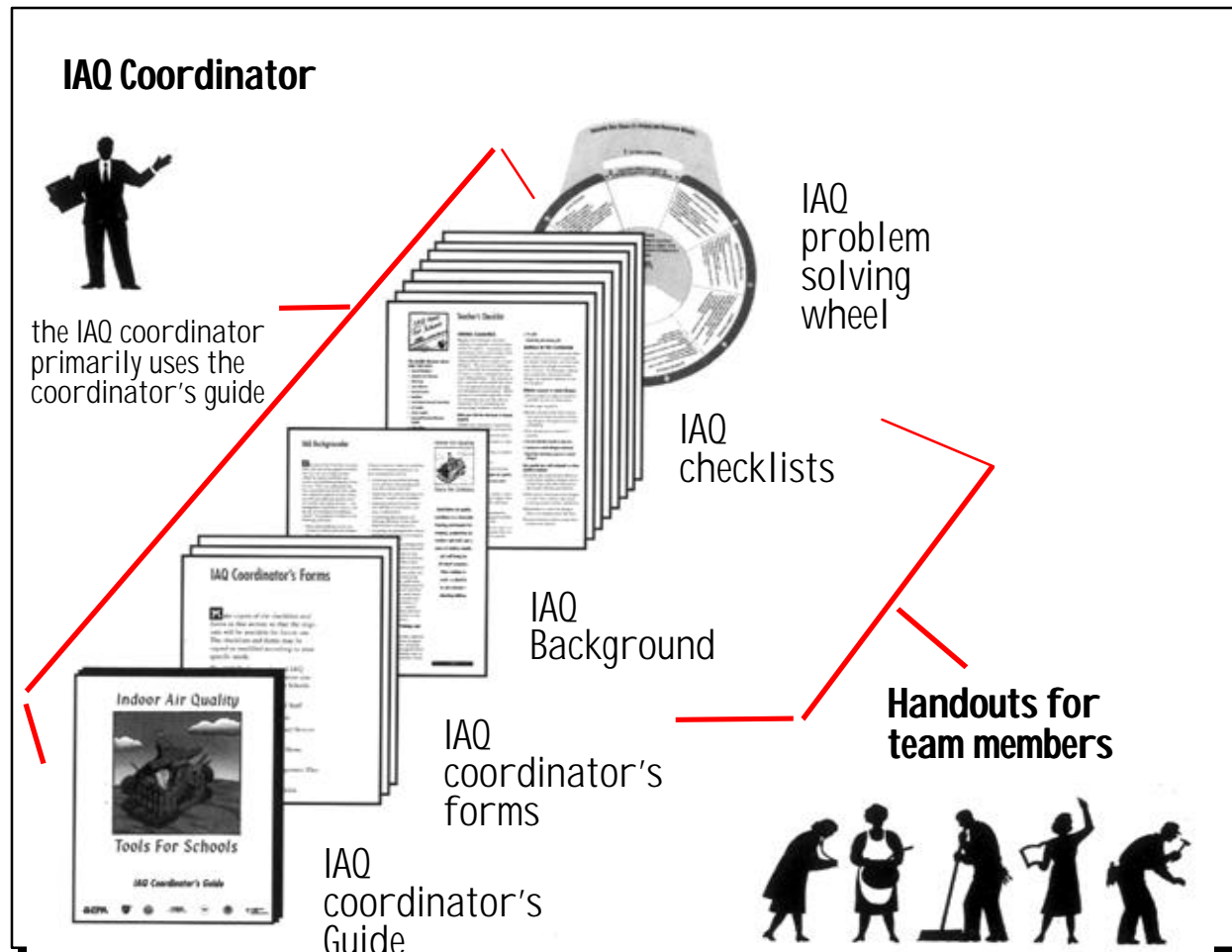


That was then...

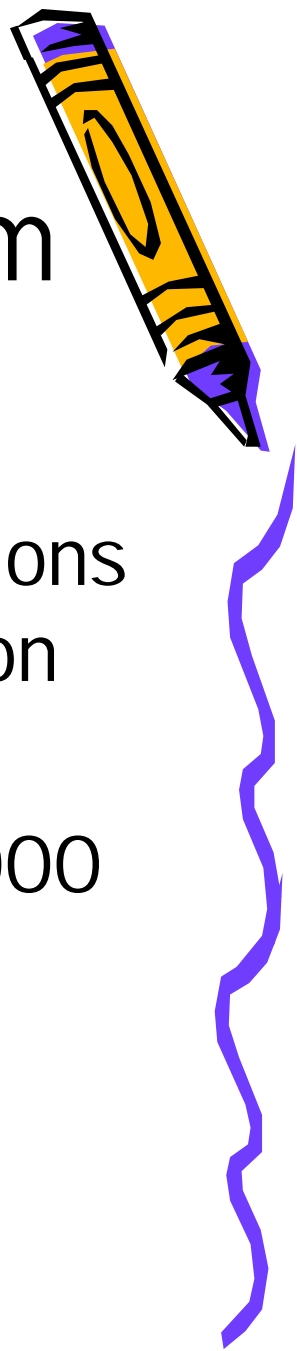
- Lack of formal I AQ program
- 'Us' vs. 'Them' mentality
 - 'Adversarial' relationship with teacher's union
- Associate Superintendent convened I AQ Process Action Team, August '97
 - Various MCPS representatives
 - Customers
 - Stakeholders



Process Action Team presents *Tools for Schools* as Program Template



I AQ Process Action Team

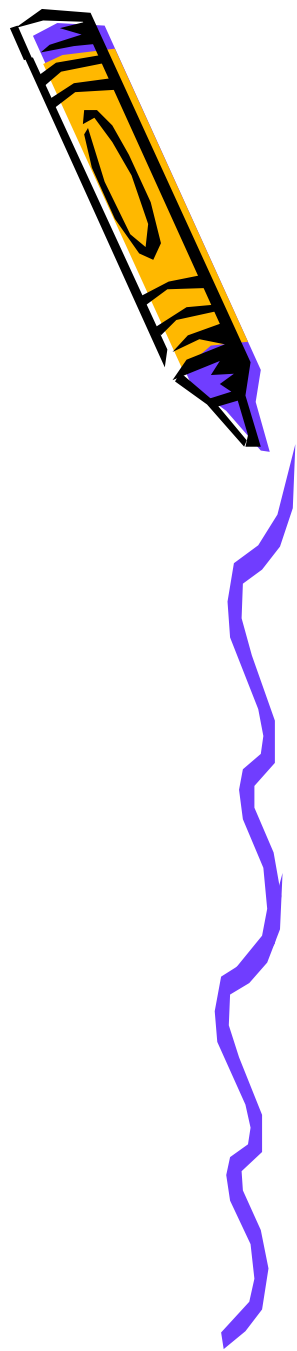


- Final report March 4, 1998
- Submitted over thirty recommendations affecting all levels of the organization
- Many recommendations addressed in reorganization of Spring/Summer 2000
- Top-down support for I AQ program
- Health and safety as part of culture



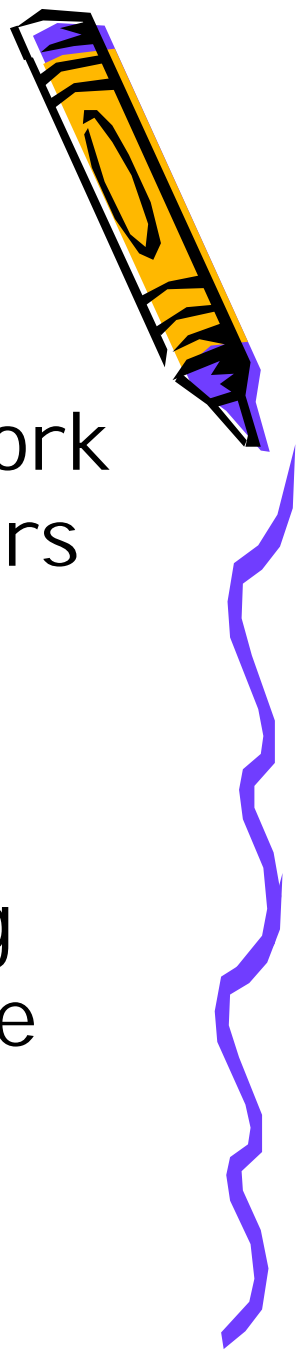
This is now!

- Team member of Department of Facilities Management
 - Division of Construction
 - Division of School Plant Operations
 - Division of Maintenance
 - Real Estate Management Team
 - Energy Management Unit
 - Environmental Safety/IAQ Office

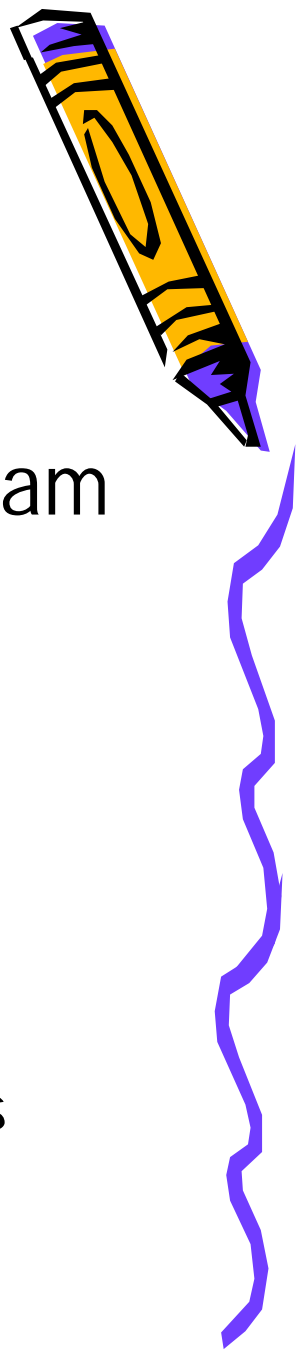


Mission Statement

- The mission of the Environmental Safety/IAQ unit is to foster teamwork among the customers and stakeholders of MCPS to help create and maintain safe and healthy public facilities for learning and employment through dedicated staff who aid in optimizing design, construction, and maintenance processes.



Role of Environmental Safety Coordinators in I AQ

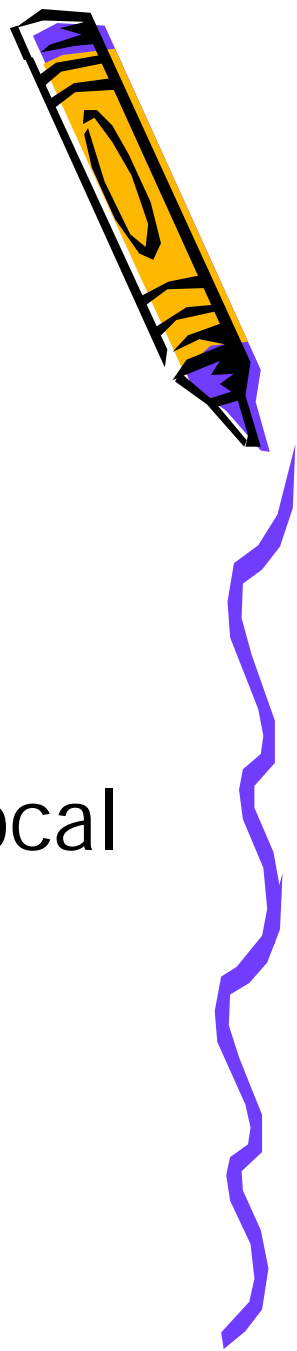


- Empowered to affect change
- Develop and implement I AQ Program
 - Develop and implement strategic plan
 - Set goals and performance measures and determine key results
- Develop budgets and allocate resources
 - Determine operating and capital budgets
 - Set priorities and identify capital projects



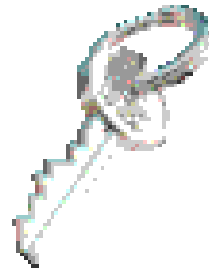
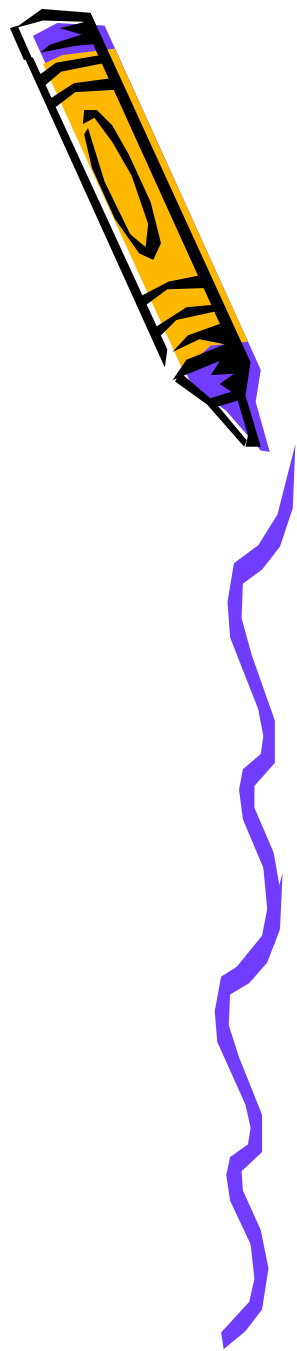
ESC Role continued

- Communicates/coordinates with other divisions/departments
 - How Safety and Health impacts activities
- Communicate with PTA groups
- Point of Contact with State and Local agencies

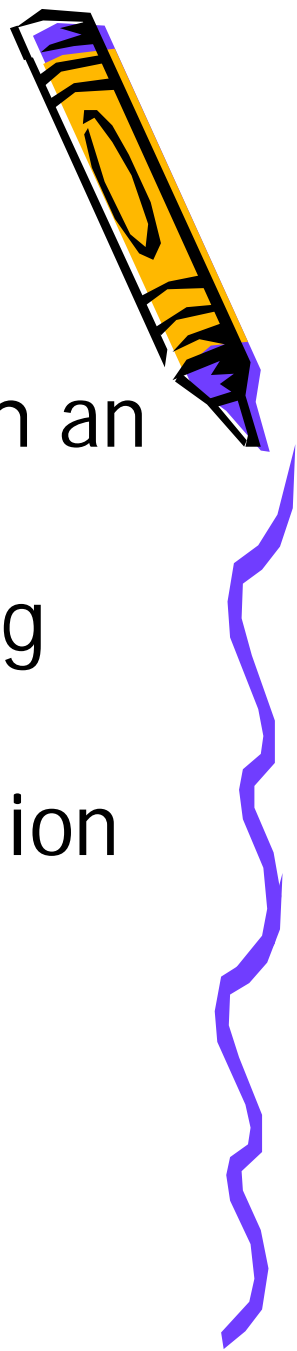


Key Features of MCPS ES/IAQ Program

- Cultural/Budgetary Commitment
- Responsive Initiative
- Proactive Initiative
- IAQ Steering Committee
- Special Projects



Budgetary Commitment



- MCPS educates over 130,000 students in over 200 facilities with an annual budget over \$1 billion
- FY 99 – Funds from DFM Operating Budget
- FY 00 – Capitol Budget of \$1.2 million
- Capitol and Operating Budget Established
 - FY01 – \$ 2.0 million
 - FY02 – \$ 2.0 million
 - FY03 – \$ 2.3 million



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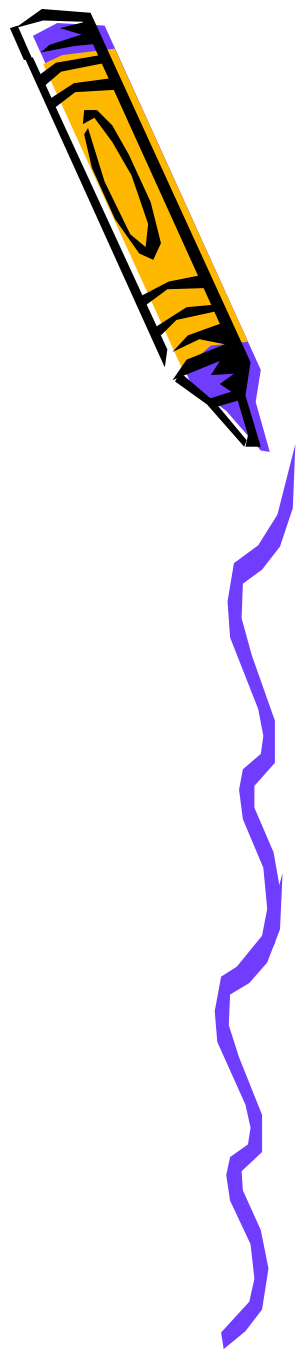
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Responsive Initiative:

- When follow up needed to form:
 - Initial Investigation by coordinators
 - Communication with Principal/staff
 - Develop corrective measures
 - Coordination, oversight, and effectiveness of response
 - Communication of effort towards customer satisfaction



Proactive Program:

- *To achieve, maintain, and where necessary, to restore an indoor air quality environment in which everyone in a MCPS facility can perform the necessary tasks of learning, teaching, administering, and sustaining facilities in a safe and healthy manner.*



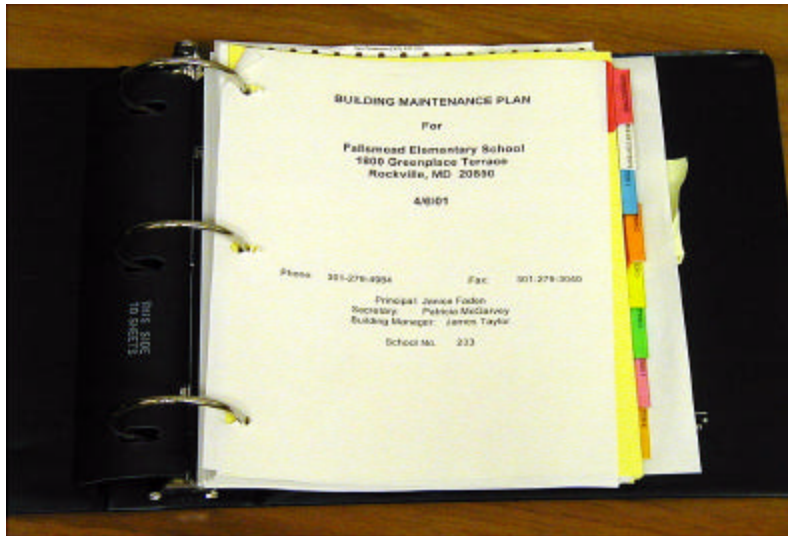
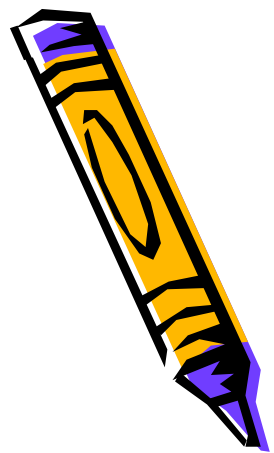
IAQ/PM Structure

Environmental Safety
Coordinators

- Two IAQ/PM Teams
 - Environmental Safety Specialist
 - IAQ/PM Supervisor
 - HVAC mechanics
 - IAQ Technicians
 - Electrician



The IAQ/PM Program



- Meet mission through front-door to back-door preventative maintenance program focused on improving the indoor learning environment



Schools Selected for I AQ/PM Program



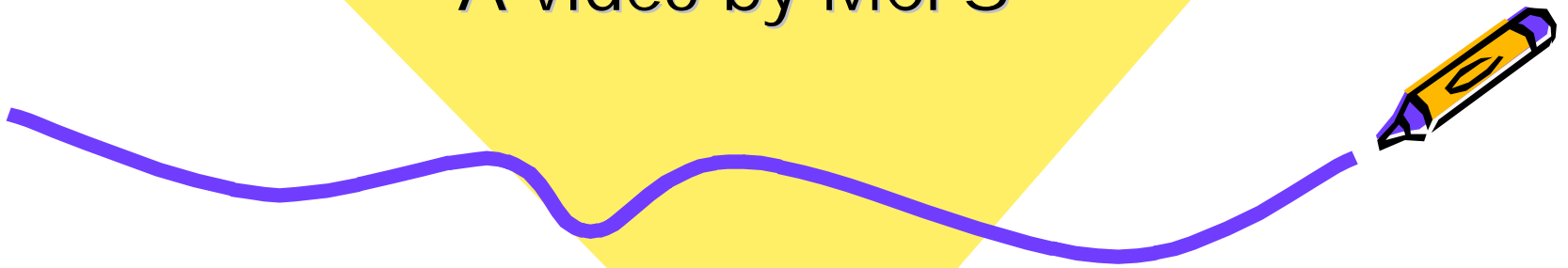
- History of I AQ complaints
- Known deficiencies
- Preliminary remediation/action plans in progress
- MC-Health and Human Services data on childhood asthma rates by zip code





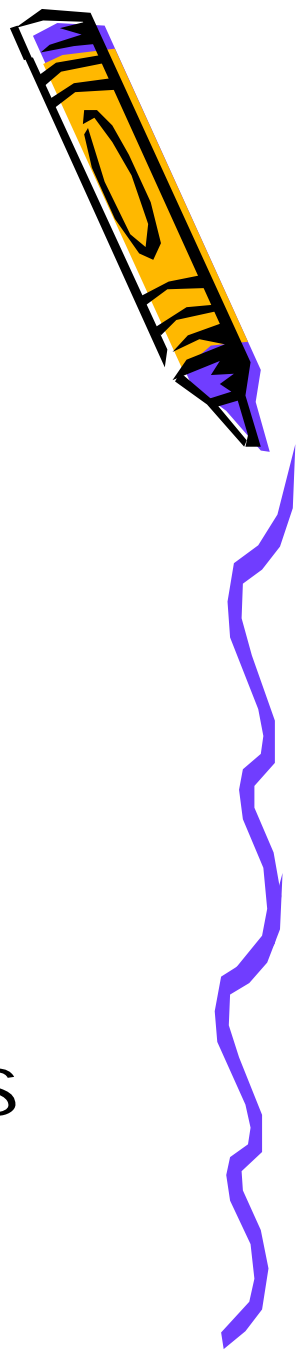
Indoor Air Quality in Schools

A video by MCPS



I AQ/PM Program

- Communication!
- Intro of *TfS* Action Kit
- Initial Assessment
- Work Plan
- Training
- Building Maintenance Plan
- Annual reassessment/PM activities



Proactive Initiative Costs:

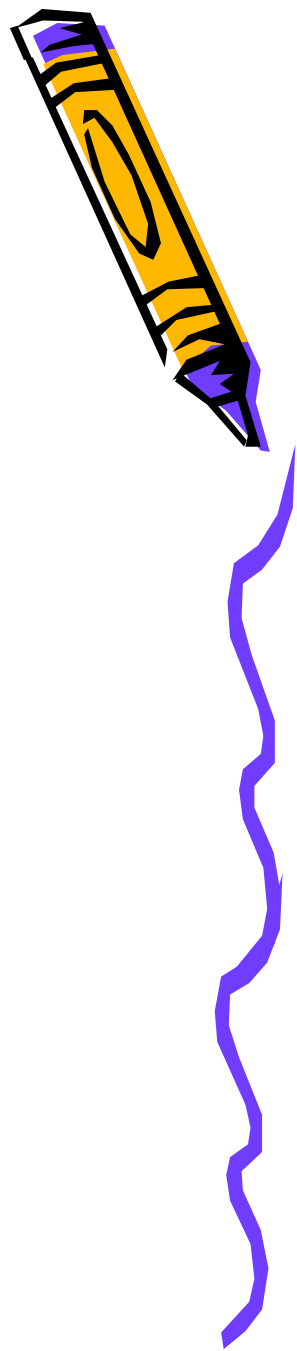


- Operating Budget
 - Salaries \$ 300,000 per team
 - Parts/Supplies \$ 70,000 per team
- Cost per building \$ 0.02 - 0.05/sq. ft.
 - Elementary School 60,000 sq. ft.
 - Middle School 100,000 sq. ft.
 - High School 225,000 sq. ft.
- Generally \$ 1,000 to \$ 9,000 per school
- Average of \$ 3,200 per school
- Big “bang for the buck” program



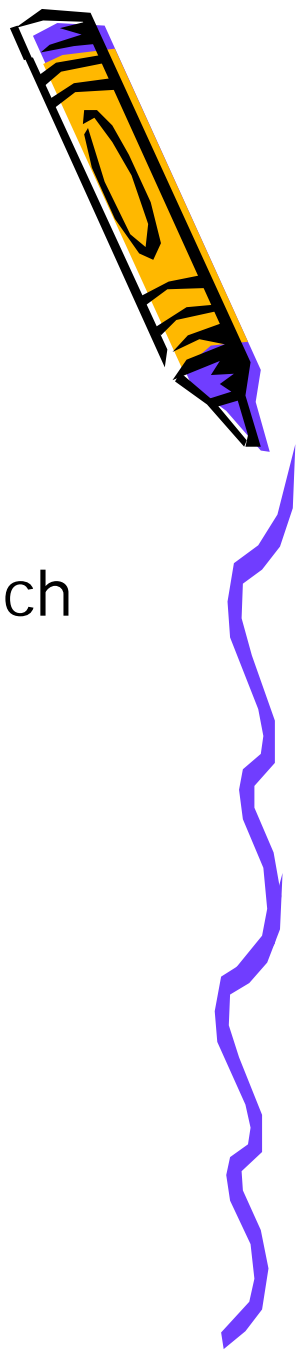
Program Assessment identified
four I AQ/PM Team Performance
Measures:

- I AQ Parameters
- Efficiency
- Effectiveness
- Customer Satisfaction



1 - IAQ Parameters

- 7 indoor environmental indices
 - Grab Temp, Long-term Temp, Rh, CO₂, CO, Housekeeping, and Air Flow
 - Set criteria AND performance goals for each parameter
- Measured before and after work plan
- Determine measurable change
 - Improved, worse, or same?
 - Did measure meet parameter goal?



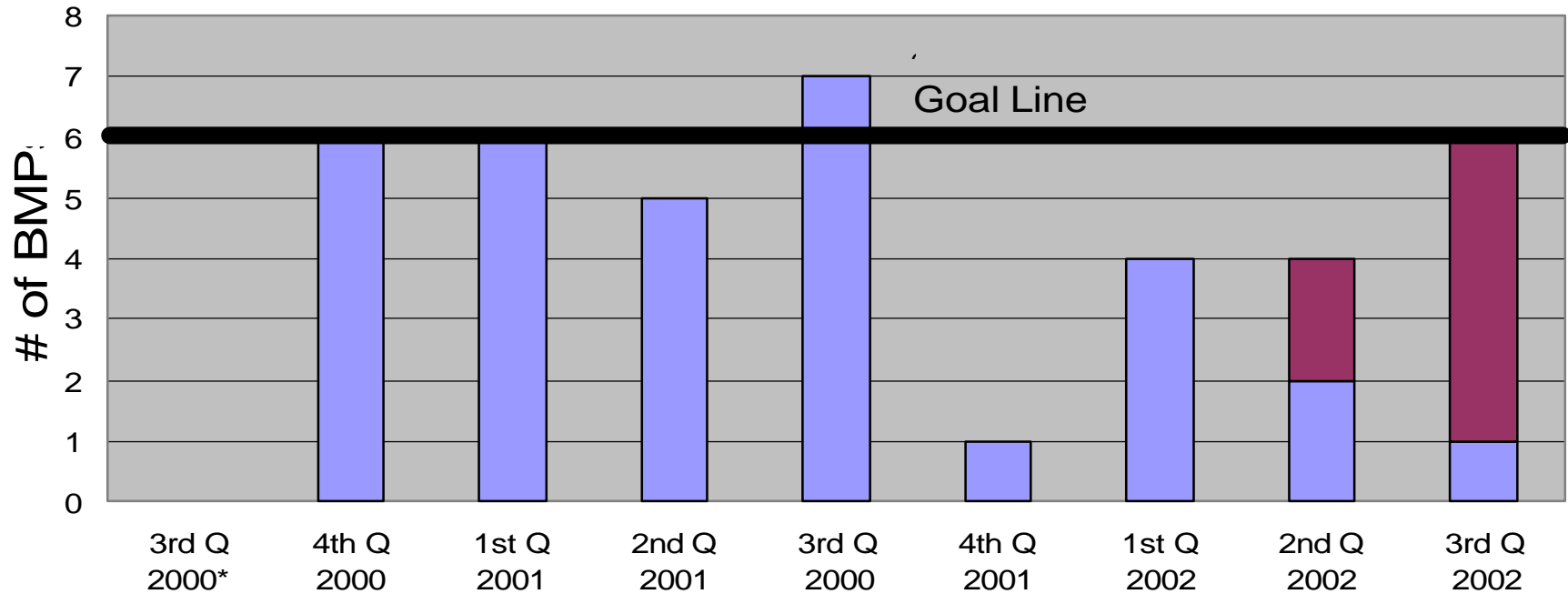
1 - IAQ Parameters

- Overall, 51% of the seven indices is the average for measurable improvement at program schools.
 - Range of 34 – 75 percent of indices
- With an average of 46% of these meeting their goals
 - Range of 14 – 88 percent of indices

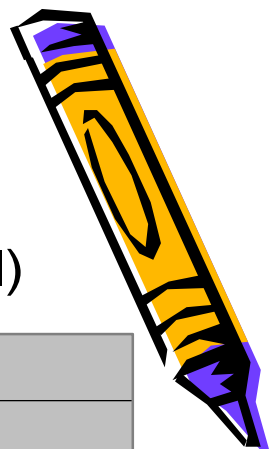


2 - Efficiency

■ BMP's Delivered (Initial) ■ BMP's Delivered(Annual)



- Measure # of facilities in the program
- Completed 81% of scheduled BMPs



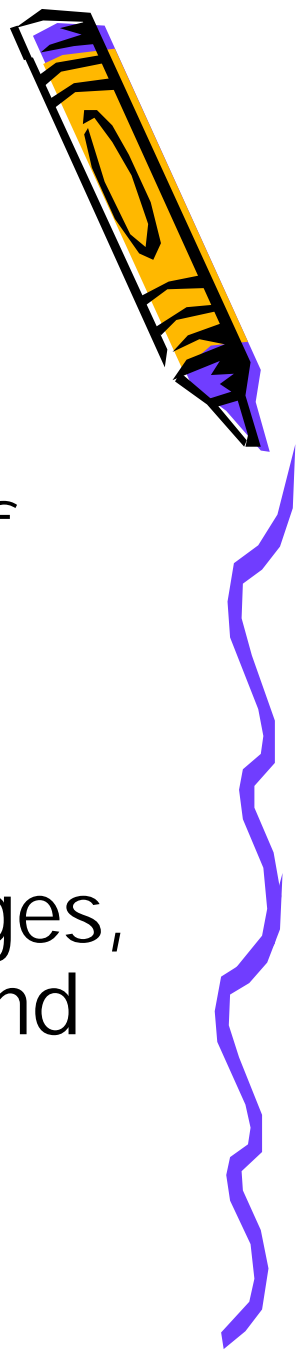
3 - Effectiveness

- Measure of overall impact of program
 - Trend of IAQ Parameter data
 - Trend of Customer Satisfaction data
 - Trend of Maintenance effort
 - Integrated with new work order system
 - To begin shortly
 - Trend of Energy Usage data
 - More difficult, may get lost in 'noise'
 - Requires more detailed development



3 - Effectiveness

- Preliminary data shows
 - Limited success in IAQ parameters
 - Measures greatly influenced by staff activities
 - Measurable increases in air flow
 - Goals met for customer satisfaction
- Performance Measure in early stages, indices continue to be developed and benchmarks set and evaluated



4 – Customer Satisfaction

'The Human Side'

- Perception of the indoor environment equally important as actual conditions
- Obtained from pre/post questionnaires
 - Perceived ventilation
 - % ill/uncomfortable
 - Team Satisfaction
- 'TRACKER' Data



4 - Customer Satisfaction

- Measure of perception of indoor environment and reported concerns
 - Efforts to address building issues and communication with staff have shown 91% of satisfaction goals being met on initial visit
 - Success level up from 88% in March 2001
 - Same high level of satisfaction from teaching staff continues during annual revisit



Next Steps

- Complete facility assessments and building maintenance plans in additional schools
- Implement *TfS* at individual school level
- Continue to measure performance and implement best practices in school design, operation, training, and maintenance
- Improve and modify program through trend analysis of performance measures



Indoor Air Quality Steering Committee



- Next step of Process Action Team
- Oversee implementation of Process Action Team recommendations
- Provide review of IAQ program
- Review of emerging technologies
- Forum for discussion of IAQ issues



Committee Members

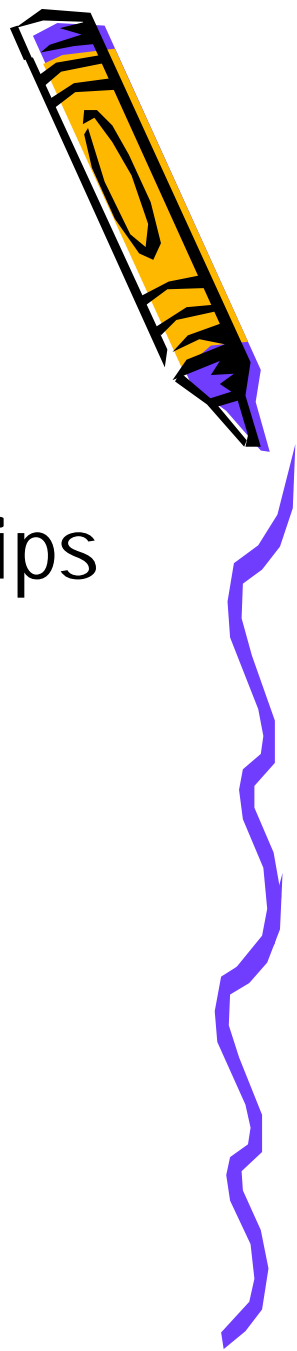


- Montgomery County Health Officer - Chair
- Facilities Administration
- Environmental Safety Coordinators
- School Maintenance
- School Plant Operations
- School Construction
- Energy Management
- Principal
- Union Members
- PTA Representative
- Safety Officer
- Community Representatives
- MC-DEP Representative
- Guests



Results of Committee

- IAQ Program developed as Team
- Building of new positive relationships
- Air of trust and mutual respect
- Working together towards IAQ solutions!
- Support for continued budgetary commitment!



Special Projects

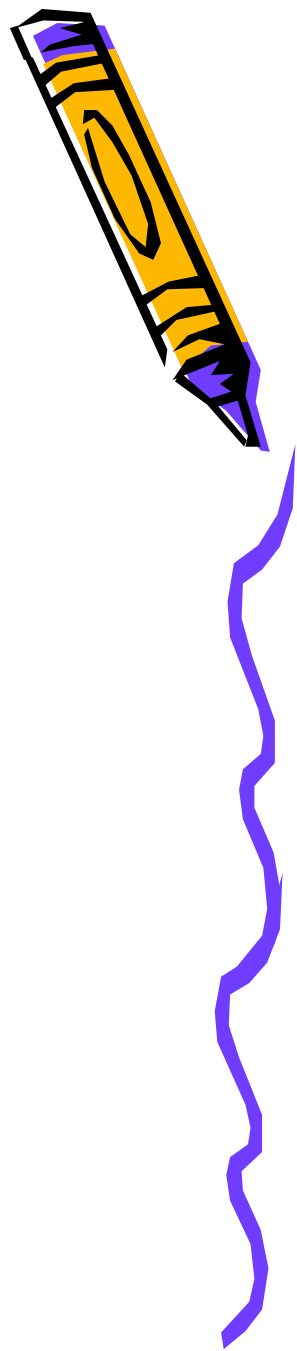


- IAQ in New Construction
 - Policies and procedures for isolating construction activities from occupied areas
- Health, Efficiency, and Productivity in Schools – Woods Research Institute
 - Pilot study to correlate improvements in the indoor environment with improvements in student performance



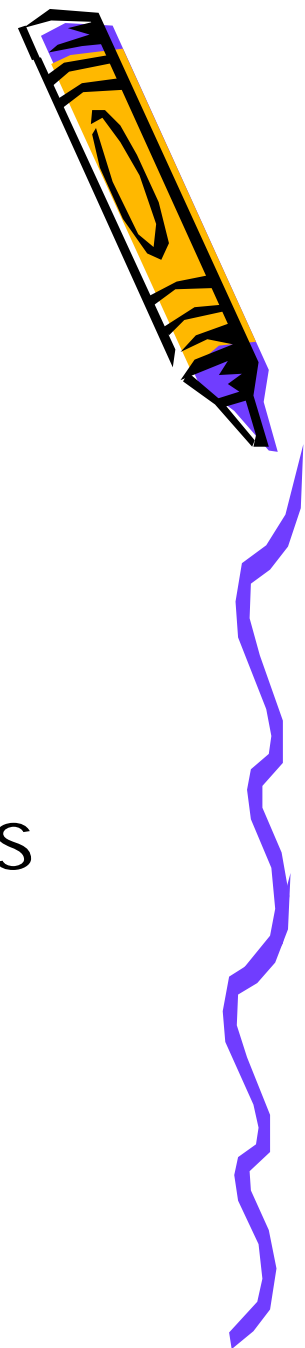
Case Study: Responding to Odors

- Flooding from rain
- Other area of concern revealed
- Unknown odors
 - Reported health effects
 - Concerned community
- Systematic evaluation by IAQ/PM Team

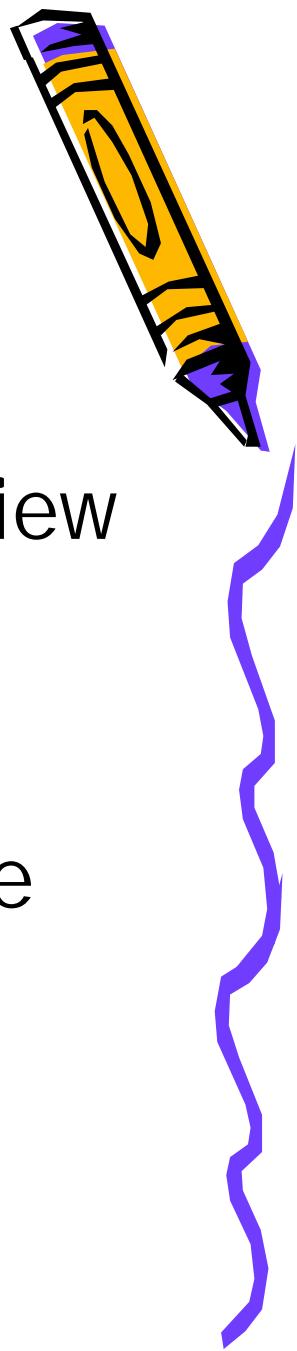


Major Findings

- Roofing and site drainage issues
- Minor ventilation issues
- Weep holes closed
- Open expansion joints
- Minor mold growth behind cabinets
- Non-specific health complaints



Response

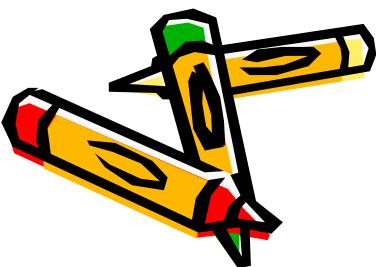
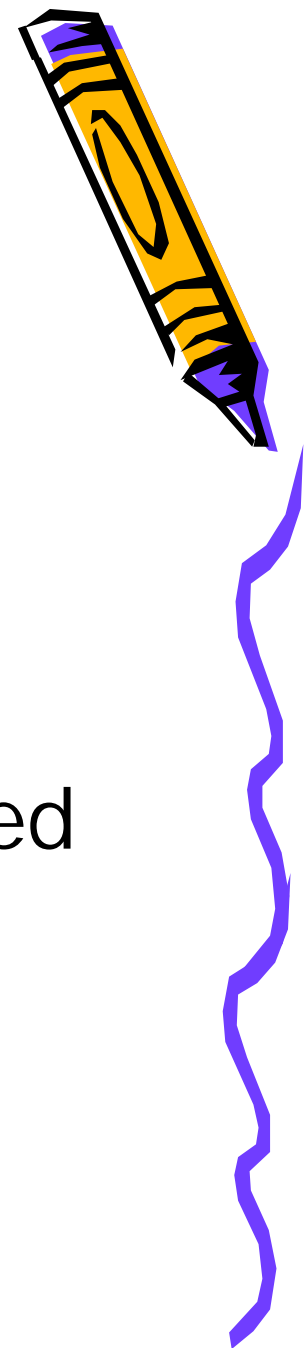


- Building deficiencies addressed through PM program and the BMP
- Occupational Health Physician review
- Bio-aerosol assessments
- Sub-slab ventilation
- Community involvement in response
- Seasonal monitoring
- COMMUNICATION



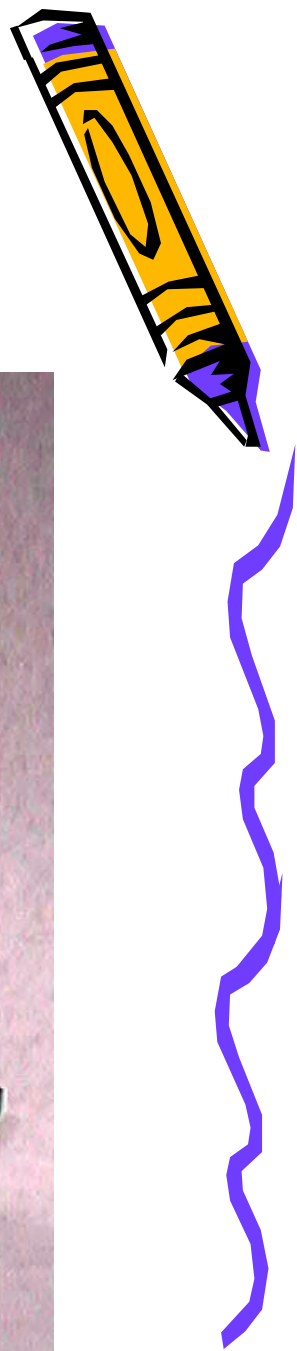
Final Outcome

- Remediation and control of odors
- Findings did not correlate health concerns with building conditions
- Community concerns addressed
- Long-term monitoring demonstrated long-term success
- COMMUNICATION!



In recognition of the MCPS IAQ Program:

- U.S. EPA *Tools for Schools*
Award for
Excellence 2001



I AQ Success Summary



- All are instrumental in success
- Prevention/cooperation is the key
- Formulate and follow a process to address concerns – *Tools for Schools*
- Formulate and implement prevention program – *Tools for Schools*
- COMMUNICATE!

